

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Burstein et al.
Appl. No.: To be assigned
Filed: Concurrently herewith
For: ELECTROCHEMICAL TREATMENT OF METALS

October 19, 2001

Commissioner for Patents
Washington, DC 20231

PRELIMINARY AMENDMENT

Dear Sir:

Please amend the above-identified application as follows:

In the Specification:

Please revise the second full paragraph beginning on page 3, line 13 to read as follows:

The electrolyte may be aqueous or non-aqueous in nature, although aqueous electrolytes are preferred for environmental reasons. Examples of suitable aqueous electrolytes include aqueous solutions of salts containing cations selected from the alkali metals, alkali earth metals, aluminum and ammonium, or other metals which, on electrolysis, do not deposit on to the surface of the metal substrate being treated, i.e. non-electroplatable metal ions. The method of the invention is, therefore, distinct from an electroplating technique as it does not result in deposition of any metallic element on to the surface of the metal being treated. Suitable counterions include hydroxide, carbonate, nitrite and nitrate. Preferred aqueous electrolytes are those of nitrogen-containing salts, such as nitrites, nitrates and ammonium salts, with sodium and potassium nitrites being particularly preferred, and sodium nitrite being the most preferred.

Please revise the first full paragraph beginning on page 5, line 1 to read as follows:

A variety of different waveforms may be used for the alternating pulses. Examples include sinusoidal waveforms, and indeed these are preferred as they are common in power supplies in industrial environments, square waveforms and triangular waveforms.

In the Claims:

Please amend Claims 1, 3, and 7-11 as follows:

1. (Amended) A method for treating a metal, comprising subjecting the metal to electrolysis in the presence of an electrolyte using alternating pulses of at least one of voltage and current, said alternating pulses being of opposite polarity, wherein if the electrolyte is an aqueous electrolyte it is an aqueous solution of a salt selected from the group consisting of alkali metal salts, alkali earth metal salts, aluminum salts and ammonium salts.

3. (Amended) A method according to claim 1, wherein the electrolyte contains nitrogen.

7. (Amended) A method according to claim 1, wherein the alternating pulses have waveform selected from the group consisting of sinusoidal waveforms and square waveforms.

8. (Amended) A method according to claim 1, which further comprises, after said step of subjecting the metal to electrolysis, heat treating the metal.

9. (Amended) A method according to claim 1, wherein the metal is in the form of a metal article or a part of a metal article for use in an environment in which it will be exposed to tribological activity.

10. (Amended) A method according to claim 1, wherein the metal is for use as a moving part in an apparatus.

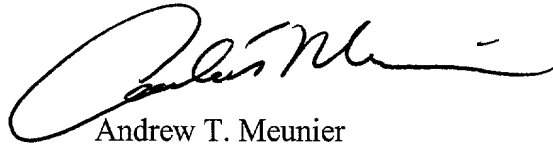
Parameter	Value	Unit
Initial concentration	1.0	g/L
Initial pH	7.0	
Temperature	25.0	°C
Time	0.0	h
Time	1.0	h
Time	2.0	h
Time	3.0	h
Time	4.0	h
Time	5.0	h
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Time	98.0	h
Time	99.0	h
Time	100.0	h

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REMARKS

Applicants have amended the specification on pages 3 and 5, and have amended Claims 1, 3 and 7-11. These amendments are non-limiting and have been made for reasons of clarification to place the application in better form for examination on the merits.

Respectfully submitted,

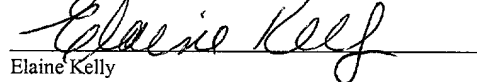


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I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Box Patent Application, Commissioner for Patents, Washington, DC 20231.


Elaine Kelly

Version With Markings to Show Changes Made:

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Please revise the second full paragraph beginning on page 3, line 13 to read as follows:

The electrolyte may be aqueous or non-aqueous in nature, although aqueous electrolytes are preferred for environmental reasons. Examples of suitable aqueous electrolytes include aqueous solutions of salts containing [cation] cations selected from the alkali metals, alkali earth metals, [aluminium] aluminum and ammonium, or other metals which, on electrolysis, [does] do not deposit on to the surface of the metal substrate being treated, ie. non-electroplatable metal ions. The method of the invention is, therefore, distinct from an electroplating technique as it does not result in deposition of any metallic element on to the surface of the metal being treated. Suitable counterions include hydroxide, carbonate, nitrite and nitrate. Preferred aqueous electrolytes are those of nitrogen-containing salts, such as nitrites, nitrates and ammonium salts, with sodium and potassium nitrites being particularly preferred, and sodium nitrite being the most preferred.

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In the Claims:

Please amend Claims 1, 3 and 7-11 as follows:

1. (Amended) A method for treating a metal, comprising subjecting the metal to electrolysis in the presence of an electrolyte using alternating pulses of at least one of voltage and[/or] current, said alternating pulses being of opposite polarity, wherein if the electrolyte is an aqueous electrolyte it is an aqueous solution of a salt selected from the group consisting of alkali metal salts, alkali earth metal salts, aluminum salts and ammonium salts.

3. (Amended) A method according to claim 1 [or claim 2], wherein the electrolyte contains nitrogen.

7. (Amended) A method according to claim 1, wherein the alternating pulses have waveform selected from the group consisting of [sinnusoial] sinusoidal waveforms and square waveforms.

8. (Amended) A method according to claim 1, which further comprises, after said step of subjecting the metal to electrolysis, heat [treatment of] treating the metal.

9. (Amended) A method according to claim 1, wherein the metal [to be treated] is in the form of a metal article or a part of a metal article for use in an environment in which it will be exposed to tribological activity.

10. (Amended) A method according to claim 1, wherein the metal [to be treated] is for use as a moving part in an apparatus.

11. (Amended) A method according to claim 1, [which is] said step of subjecting the metal to electrolysis being carried out *in situ* on apparatus selected from the group consisting of engineering equipment and storage tanks.